फाइल नं0-71-1002/1/2022

94/2022/।/194549/2022

प्रेषक,

शुभ्रा सक्सेना,
विशेष सचिव
उ0प्र0 शासन।

सेवा में,

महानिदेशक,
चिकित्सा शिक्षा एवं प्रशिक्षण,
उ0प्र0, लखनऊ।

चिकित्सा शिक्षा अनुभाग-1 लखनऊ : दिनॉक 26 जुलाई, 2022

विषयः- चिकित्सा शिक्षा के अन्तर्गत संचालित मेडिकल कालेजों/चिकित्सा संस्थानों में स्किल लैब की स्थापना हेतु लगाये जाने वाले उपकरणों हेतु मानकीकृत तकनीकी विशिष्टियों के निर्धारण के संबंध में।

महोदय,

उपर्युक्त विषयक अपने पत्र संख्या-एम0ई0-1/2022/2299, दिनॉक 12.07.2022 का कृपया संदर्भ ग्रहण करने का कष्ट करें।

2- इस संबंध मे मुझे यह कहने का निदेश हुआ है कि चिकित्सा शिक्षा के अन्तर्गत संचालित मेडिकल कालेजों/ चिकित्सा संस्थानों में स्किल लैब की स्थापना हेतु उपकरणों की आवश्यकता एवं औचित्य तथा स्पेसिफिकेशन के निर्धारण हेतु डॉ0 दीपक मालवीय, आचार्य, एनेस्थीसिया विभाग, डा0 राम मनोहर लोहिया आयुर्विज्ञान संस्थान, लखनऊ की अध्यक्षता में गठित समिति द्वारा स्किल लैब की स्थापना हेतु उपकरणों के क्रय हेतु निर्धारित किये गये स्पेसिफिकेशन (संलग्न प्रपत्र के अनुसार) निर्गत किये जा रहे है।

3- कृपया मेडिकल कालेजों/संस्थानों में स्किल लैब की स्थापना हेतु संलग्न स्पेसिफिकेशन के आधार पर उपकरणों का क्रय किये जाने के संबंध में निम्न दिशा-निर्देशों का अनुपालन सुनिश्चित किया जायः-

1- मेडिकल कालेजों/संस्थानों में स्किल लैब की स्थापना हेतु उपकरणों के स्फेसिफिकेशन संलग्न है, तद्नुसार स्किल लैब हेतु उपकरणों को संलग्न तकनीकी विशिष्टियो के आधार पर स्थापित किया जाय।
2- मेडिकल कालेजों एवं संस्थानों में स्किल लैब की स्थापना हेतु उपकरणों के क्रय/स्थापना हेतु समिति द्वारा निर्धारित तकनीकी विशिष्टियॉ 03 साल तक वैध रहेंगी। उक्त विशिष्टियों के आधार पर वर्ष 2022-23, 2023-24 एवं 2024-25 में उपकरणों का क्रय किया जाना सुनिश्चित किया जाय।
3- स्किल लैब हेतु उपकरणों की स्थापना करने से पूर्व यह सुनिश्चित किया जाय कि उपकरणों की वास्तविक रूप से आवश्यकता है।
4- स्किल लैब हेतु उपकरणों के मानक व गुणवत्ता की जिम्मेदारी महानिदेशक, चिकित्सा शिक्षा एवं प्रशिक्षण, उ0प्र0/संबंधित प्रधानाचार्य/संबंधित निदेशक की होगी
5- यह भी सुनिश्चित कर लिया जाए कि उपकरणों की स्थापना हेतु स्थान, भवन आदि उपलब्ध है तथा संचालन हेतु मानव संसाधन उपलब्ध है।
6- मेडिकल कालेज/संस्थान में स्किल लैब हेतु उपकरणों का क्रय/स्थापना किये जाने में व्यापक प्रचार-प्रसार किया जाय
7- उक्त उपकरण का क्रय/स्थापना किये जाने के सम्बन्ध में समस्त औपचारिकतायें नियमानुसार पूर्ण किये जाने के पश्चात उपकरण क्रय किये जाय। उपकरण का क्रय सक्षम स्तर का अनुमोदन प्राप्त करने के पश्चात ही किया जाय।
8- राष्ट्रीय स्वास्थ्य मिशन से प्राप्त होने वाली स्किल लैब में उल्लिखित, वर्तमान में मेडिकल कालेज /चिकित्सा संस्थान में उपलब्ध एवं क्रियाशील उपकरणों की गैप एनालिसिस करते हुए अतिरिक्त उपकरण क्रय किये जाये।
9- मेडिकल कालेजों एवं संस्थानों में उपकरण के क्रय में 05 वर्ष की वारण्टी/ सी0एम0सी0/ई-प्रोक्योरमेन्ट में इस बिन्दु को अनिवार्य रूप से सुनिश्चित किया जाय।
10- मेडिकल कालेजो एवं संस्थानों में उपकरण का क्रय सर्वप्रथम जेम पोर्टल से किया जाए। जेम पोर्टल पर उपकरण उपलब्ध न होने पर ई-टेण्डर के माध्यम से किया जाए।
11- उपकरण की क्रय प्रक्रिया में सूक्ष्म लघु एवं मध्यम उद्यम तथा निर्यात प्रोत्साहन विभाग के सुसंगत शासनादेश तथा उ0प्र0 प्रोक्योरमेन्ट मैनुअल 2016 का अनुपालन सुनिश्चित किया जाय।
12- सूक्ष्म, लघु एवं मध्यम उद्यम एवं निर्यात प्रोत्साहन अनुभाग-2 के शासनादेश संख्या-1/2018/868/18-2-2017-2(एस0पी0)/2017, दिनॉक 15.01.2018 में विहित व्यवस्था का अनुपालन सुनिश्चित करते हुए कार्यालयाध्यक्ष तथा विभागाध्यक्ष द्वारा क्रयाधिकार संबंधी सीमाओं के अन्तर्गत क्रय प्रक्रिया सम्पादित की जायेगी।

4- कृपया उपर्युक्तानुसार दिशा-निर्देशों का कड़ाई से अनुपालन सुनिश्चित कराने का कष्ट करें।

संलग्नक-यथोक्त।

भवदीय

(शुभ्रा सक्सेना)
विशेष सचिव

1- यह शासनादेश इलेक्ट्रानिकली जारी किया गया है, अत: इस पर हस्ताक्षर की आवश्यकता नहीं है ।

2- इस शासनादेश की प्रमाणिकता वेब साइट http://shasanadesh.up.nic.in से सत्यापित की जा सकती है ।

http://shasanadesh.up.nic.in

संख्या:- उपरोक्त तद्यदिनांक

प्रतिलिपि निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित:-

1. निदेशक, एस0जी0पी0जी0आई0, लखनऊ।
2. प्रबन्ध निदेशक, राष्ट्रीय स्वास्थ्य मिशन, लखनऊ।
3. कुल सचिव, के0जी0एम0यू0, लखनऊ।
4. कुल सचिव, उ0प्र0 ग्रामीण आयुर्विज्ञान संस्थान, सैफई इटावा।
5. निदेशक, डा0 राम मनोहर लोहिया आयुर्विज्ञान संस्थान, लखनऊ!
6. निदेशक, गवर्नमेन्ट इंस्टीट्यूट आफ मेडिकल साईंसेज, ग्रेटर नोएडा।
7. निदेशक, सुपर स्पेशियलिटी बाल चिकित्सालय एवं स्नातकोत्तर शिक्षण संस्थान, नोएडा।
8. निदेशक, सुपर स्पेशियलिटी कैंसर संस्थान, लखनऊ।
9. समस्त प्रधानाचार्य, स्वशासी एवं राजकीय मेडिकल कालेज, उ0प्र0।
10. समस्त प्रधानाचार्य, स्वशासी राज्य चिकित्सा महाविद्यालय, उ0प्र0।
11. निदेशक, हृदय रोग संस्थान, कानपुर तथा जे0 के0 कैंसर संस्थान, कानपुर।
12. चिकित्सा शिक्षा अनुभाग-2, 3 एवं 4
13. गार्ड फाइल।

आज्ञा से

(एस0 पी0 सिंह)
अनु सचिव

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संलग्नक

WIRELESS TRAUMA CARE AND ANAESTHESIA MANAGEMENT SIMULATOR (ADULT MALE)

The human patient simulator should comprise of a life like adult male mannequin, integrated with CPR analysis which must be compliant with at least American Heart Association's 2015 guidelines with correct hand placement, depth, and rate of compressions being captured with following specifications:-

1. It should employ multiple models of validated human physiology including cardiovascular system, pulmonary system, neuromuscular system, and central nervous system. The models should allow the patient to exhibit clinical signs (e.g., spontaneous breathing, eyelid blinking) and monitored parameters (e.g., electrocardiogram, blood pressure) and should automatically respond to therapeutic intervention without any/ minimal input from the instructor.
2. The mannequin should be controlled completely wirelessly and should not be connected to any control system/instructor computer through wires/hoses.
3. The mannequin should have a realistic skeletal structure, providing true-to-life articulated motion.
4. The simulator should have facilities to teach the following skills
   a. Intravenous cannulation
   b. Head tilt-chin lift, Jaw thrust methods
   c. Airway skills
   - Controllable open / closed airway, automatically or manually controlled
   - Suctioning (Oral and Nasopharyngeal)
   - Bag-Valve mask ventilation
   - Orotracheal intubation
   - Nasotracheal intubation
   - Combitube placement
   - LMA placement
   - Endotracheal tube intubation
   - Right Mainstream
   - Retrograde intubation
   - First grade fiber-optic intubation
   - Light wand intubation
   - Needle cricothyrotom
   - Surgical cricothyrotomy

   d. External pacing
5. The patient simulator should have a cardiovascular system that automatically calculates dependent variables (e.g., blood pressure, heart rate) in response to changing cardiovascular system status (e.g., bleeding, intravenous fluid administration), including the following:

A Baroreceptor reflex that compensates both centrally (e.g., heart rate, cardiac contractility) and peripherally (e.g. systemic vascular resistance, venous capacitance) to maintain circulation and perfusion.

B Myocardial oxygen supply (e.g., diastolic blood pressure, arterial oxygen partial pressure) and demand (e.g., cardiac contractility, heart rate) that yields appropriate cardiac response (e.g., cardiac rhythm, cardiac contractility) to myocardial ischemia. Untreated myocardial ischemia should automatically result in cardiovascular decompensation with accompanying cardiac rhythms (e.g., ST- segment depression, ventricular tachycardia, ventricular fibrillation, asystole) and ultimately, cardiovascular collapse.

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C Arterial blood gases (e.g., PaO2, PaCO2, and pH) and mixed venous gases (e.g., PvO2, PvCO2) that realistically change.
D Hematocrit should be automatically calculated to reflect oxyhemoglobin saturation and administration of a variety of intravenous fluids, such as whole blood, packed red cells, colloids, and crystalloids.

E. A complete hemodynamic monitoring package that includes the capability to measure and monitor the following:

ABP, Left ventricular blood pressure, CVP, Right atrial pressure, Pulmonary artery pressure, Pulmonary artery occlusion (wedge) pressure, cardiac output.
6. The patient simulator should have a pulmonary system that automatically calculates alveolar and arterial gas partial pressures in response to ventilation, fraction of inspired oxygen, intrapulmonary shunt fraction, and metabolic gas exchange (For example, apneaorhypoventilation should automatically result in hypercarbia, hypoxemia, decreasing oxyhemoglobin saturation and tachycardia)

A. During spontaneous ventilation, the patient mannequin should breathe with a spontaneously controlled respiratory rate and tidal volume to maintain normocarbia and adequate oxygenation.

B. Positive pressure ventilation or return of spontaneous ventilation should automatically reverse apnea with the response appropriate to the rate and tidal volume or ventilation.

C. The Patient Simulator should automatically responds to the fraction of inspired oxygen present, such as with smoke inhalation or supplemental oxygen.

D. Should have pre-cut for bilateral chest tube insertion for saving skin replacement, chest tube insertion with fluid output and automatic resolution of physiology.

7. The patient simulator should have a pharmacology system model with automatic calculation of pharmacokinetics and pharmacodynamics for all commonly used intravenous and inhaled medications, yielding appropriate changes in patient clinical signs and monitored parameters. All patient responses to drug administration should be automatic, dose dependent, and follow an appropriate time course even in case of students errors.
8. Patient outcome should be solely based on patient physiology and the treatment administered (e.g., ventilation, oxygen therapy, drug therapy) and should not be influenced by subjective assessment of the operator thus providing objective evaluation of clinical performance and reducing risk of negative training transfer
9. Patient simulator should be equipped with a simulated monitor capable of displaying all of the following parameters: ECG, Invasive Blood Pressures (ABP, CVP, PAP, and Wedge Pressure), Cardiac Output, SpO2, PR/HR, ETCO2, Body and Blood Temperature, NIBP
A. The simulated monitor should have configurable alarm limits with accompanying sounds for each parameter.
B. The frequency of the pulse tone should be synchronized with the cardiac cycle and the pitch should correlate with the SpO2 value.
10. The mannequin should have a realistic airway (mouth, oropharynx, larynx, oesophagus, trachea, carina) resembling to that of an actual human patient.
A. Depending on head positioning, choice of clinical tools, and other manoeuvres, it should be possible to achieve anywhere from a Cormack Class I (e.g., easy intubation) to a Cormack Class IV (e.g., difficult intubation) airway.

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B. The mannequin airway should allow use of airway adjuncts (e.g., combitube, laryngeal mask airway) as they are used in real patients, without any special adjustments by the instructor (e.g., activation of posterior swelling to seat the LMA).

C. The success or failure of airway management should be automatically reflected in the resulting ventilation, oxyhemoglobin saturation, and overall cardiopulmonary stability.

11. The patient simulator should have trauma simulation capabilities, such as:

A. Surgical cricothyroidotomy

B. Articulated mandible

C. Articulation in elbow, wrist, knees and elbows

D. Simultaneous bleeding at different sites linked to physiology

E. Secretions from eyes, ears, mouth.

F. Bi-lateral pneumothorax needle decompression at the clinically appropriate location

G. Bi-lateral chest tube insertion (with fluid return) at the clinically correct location.

Each trauma capability should require minimal instructor input and physiological consequences (e.g., improvement in blood pressure, ventilation, and oxyhemoglobin saturation) should be automatic.

12. The patient simulator should have fully independent left and right lungs.

A. One-sided pneumothorax should result in chest distension on one side, with the other side rising and falling with spontaneous breathing.

B. The simulator should have independent breath sounds linked to ventilation of each lung for both spontaneous and mechanical ventilation.

C. One-lung ventilation should automatically result in appropriate breath sounds, chest excursion, and pulmonary gas exchange.

D. Independent bilateral trauma feature (needle decompression / chest tube)

13. The patient simulator should have independent blinking eyes and reactive pupils. Eye blinking should be automatic and dependent on the underlying patient physiology (i.e., level-of-consciousness, level of neuromuscular blockade). It should be possible to easily set the pupils to different settings (i.e., pinpoint, reactive, non-reactive, blown).

14. The patient simulator should be capable of physically shaking, giving a visible clue of convulsions, tremors, or other similar conditions.

15. The patient simulator should have touch activated, bi-lateral palpable pulses in the following locations: Carotid, Brachial, Radial, Femoral, Popliteal, Pedal (dorsalis and tibialis)

16. The patient simulator should have an advanced cardiac life support system in which:

A. Effective chest compressions automatically yield artificial circulation, cardiac output, central and peripheral blood pressures, palpable pulses, and exhaled CO2.

B. Ineffective chest compressions yield inadequate cardiac output and circulation and an absence of exhaled CO2.

C. Defibrillation energy is automatically identified, quantified, and logged

D. Pacing current is automatically identified, quantified, and logged, with appropriate physiological response.

17. The patient simulator should include independent simulations of patients (e.g., young healthy male, pregnant female, elderly patient with coronary artery disease) and injury/disease scenarios (e.g., anaphylactic shock, ruptured spleen, subdural hematonia.)

A. It should be possible to combine any patient with any scenario, creating a wide variety of clinical care simulations.

B. It should be possible to run multiple conditions simultaneously to create multi-trauma care simulations.

C. It should be possible to run multiple injury/disease scenarios simultaneously on a particular patient to create multi-trauma simulations

18. Simulator must have the following in build Learning Module Scenarios:

A. Advanced Cardiac Life Support (ACLS) as per 2015 Guidelines

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B. Airway Management –I

PAEDIATRIC PATIENT CARE SIMULATOR

-GENERAL FEATURES:

-1. The simulator mannequin must be anatomically correct to replicate a real life sized paediatric patient with anatomical landmarks.

-2. The simulator must have functional pupils that blink and have simulated eyes, which automatically react to light

-3. The simulator must have automatic physiology response models that can objectively confirm airway management without the need for visual observation by an instructor

-4. The simulator must have a hematology model for hemorrhage control showing the impact of progressive blood loss and compensation to the patient in real time

-5. The simulator must have the capability to integrate a blood / secretions flow model for representation of trauma conditions to the patient

-6. The simulator must have automatic physiological and pharmacological response models with responses to reflect the actual effects of the drug or multiple sets of drugs

-7. The simulator and its accompanying components must be portable and easily stored when necessary.

-8. Simulators eyes must be able to display patient symptoms and conditions including conditions including jaundice, hemorrhage , keyhole pupil, cataract , blood shot or droopy eyes.

-9. The simulator must include a simulated patient monitor, which has the capability to display the parameters below in addition to custom configurations

- ECG I, II, III and V and heart rate
- Arterial Blood Pressure
- Pulmonary Artery Pressure
- Pulmonary Capillary Wedge Pressure
- Central Venous Pressure
- Mean Arterial Pressure
- Non Invasive Blood pressure
- CO2 Capnography
- SPO2
- Heart rate
- Thermolidution cardiac output and continuous cardiac output
- Blood temperature
- Body temperature

AIRWAY

1. Simulator must have a life like intubation head with a flexible tongue, epiglottis, aryepiglottic fold, cuneiform tubercle, corniculate tubercle ,laryngeal inlet, vocal cords , esophagus and simulated lungs for spontaneous breathing and realistic chest movement and compressions, substernal retractions
2. -Simulator must have tracheal access through the neck for cricothyrotomy ,tracheostomy
3. -Should support mechanical ventilation
4. The simulator must have the following standard ALS airway skills:

- Bag/ valve/mask ventilation
- Oral intubation

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- Nasal intubation
- Esophageal intubation
- Combitube placement
- LMA Placement
- Retrograde intubation
- Fiber optic intubation
- Light wand intubation
- Cricothyrotomy
- Oropharyngeal and nasopharyngeal airway placement

-4. Exhaled CO 2 Flow to confirm placement of airway devices with in the trachea
-5. Signs of spontaneous respiration to include:

- Independent right and left chest movement
- Exhalation of air from mouth
- Exhaled CO2 Capability.

-6. Simulator must have a respiratory rate that is physiologically modeled or may be manually controlled by an instructor.
-7. The simulator must be able to accommodate the following airway features:

- Pharyngeal obstruction
- Multiple levels of swollen tongue
- Laryngospasm
- Left & right broncheal obstruction
- Stomach decompression
- Cannot intubate, can ventilate
- Cannot intubate, cannot ventilate

-CARDIOVASCULAR SYSTEM:
-1. The simulated patient should generate heart sounds including a range of pathological ones, which are synchronized to the QRS complex of the ECG and should be audible with a standard stethoscope over the left and right upper sternal border, left lower sternal border and apex.
-2 The simulator must have an integrated IV training arm with replaceable skin and veins, IV insertion into peripheral veins of forearm, anticubital fossa and the dorsum of the hand, simulated blood flash back on cannulation, IV Bolus or infusion.
-3. 5 Lead ECG capability emitted from the appropriate positions on the patient's chest for display on a standard monitor
-4. Palpable carotid, radial, brachial, femoral, popliteal and pedal pulses, which are synchronous to the ECG.
-5. Simulator pulses must be dependent on BP of the patient and must be independently controlled on left & right side of the body
-6. A standard blood pressure cuff and sphygmomanometer can be used to assess systolic blood pressure by palpation or by auscultating Korotkoff sounds.
-7 The invasive hemodynamic monitoring package should provide the capability to measure and monitor the following:

- Arterial blood pressure
- Left ventricular pressure
- Central venous pressure

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- Right atrial pressure
- Right ventricular pressure
- Pulmonary artery pressure
- Pulmonary artery occlusion (wedge) pressure
- Thermodilution cardiac output

-TRAUMA FEATURES:

Simulator must have the ability to perform the following trauma functions:

- Bi-Lateral Pneumothroax needle decompression
- Bi-lateral chest tube placement
- Blinking eye with light reactive pupils

-IV DRUG ADMINISTRATION:

1. Simulator must have an intensive drug library that includes ACLS drugs.
2. The simulators response to drugs administered must be automatically linked to physiology and will not rely on manual input.

-CARDIAC FUNCTIONS:

1. The simulator package must include an ECG library that contains an extensive library of physiological modeled cardiac rhythm variations
2. The simulator must be able to accommodate the following:

- Live defibrillation from an AED and a manual defibrillator
- Cardiac monitoring with blood pressures and cardiac output
- 5 Lead ECG Monitoring
- External pacing with various pacing threshold
- Produce chest compression artifacts on ECG
- Show a displayed heart rate and ECG on a compatible simulated monitor

-BLOOD PRESSURE:

-1. The simulator must have a blood pressure that can be taken either automatically, by auscultation or palpated.
2. The simulator must include a blood pressure arm that has Korotkoff sounds, which can be used for auscultation and palpation of the blood pressure.
3. The blood pressure must be able to be displayed on a compatible simulated monitor.

-GENITOURINARY

1. The simulator must include both male and female genitalia, which are interchangeable and anatomically correct
2. The genitalia must have the ability to be catheterized with the ability to produce urinary output.
3. Should allow enema insertion

-NEUROLOGIC SYSTEM

1. Should model Cardiovascular and respiratory responses to sympathetic and parasympathetic activities
2. Should be able to simulate seizures.

Specification for Pediatric Airway (to facilitate bronchoscopy practice)

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- It should be able to teach about how to recognize upper airway anatomy, and the hand to maneuver thin FFBs and rigid tubes and instruments in a confined space.
- It should be a pediatric trainer with physical characteristics of a three to five year old child
- It should facilitate introduction to flexible and rigid pediatric bronchoscopy
- It should provide help in learning more advanced procedures, such as foreign body extraction and stent placement
- It should help trainees to practice negotiation through tracheobronchial tree providing simulation of pediatric tracheobronchial tree
- It should have spring based support for tracheobronchial tree increasing pliability reducing likelihood of bronchoscopy damage
- It should have following components

1. Head with ribcage
2. Movable fitted head with nasal cavity mouth and throat
3. Larynx with removable bronchial tree
4. Chest cover
5. Sternum with auscultation membranes on right and left
6. Trunk with folding hinge mounted on baseboard
7. Silicone oil, 125 ml pressure spray bottle
8. Instructions for use

Height 20 cm, width 46 cm, depth 30 cm, weight 3.9 kg.

ADVANCED CARDIAC LIFE SUPPORT (ACLS) SYSTEM

-1 **Airway Management and Ventilation:** Alveolar and arterial gas concentrations should appropriately reflect the efficacy of the employed ventilatory technique, such as mouth-to-mouth, bag-valve-mask, endotracheal intubation and transtracheal catheter ventilation. Administration of supplemental oxygen should extract automatic and appropriate patient clinical responses.

-2 **Chest Compression: Should allow chest compression** In accordance with ACLS guidelines, effective chest compression of the patient's sternum should result in artificial circulation, cardiac output, central and peripheral blood pressures, palpable pulses and CO2 return and Pressure fluctuations should be visible on invasive catheter waveforms..

3. **-Cardiac Arrhythmias:** The instructor should be able to select and maintain a desired arrhythmia and control the simulated patient's response to clinical interventions.
4. **-Electrical Therapy:** Both conventional defibrillators and automatic external defibrillators (AEDs) can be applied to the simulator generating appropriate patient response in real-time. Capable of applying transcutaneous pacemakers
5. **-Pharmacological Therapy:** All IV drugs required by the ACLS algorithms should be supported.

-SOUNDS AND PHONATION:

The simulator must have the ability to produce the following sounds:
Speaking through the instructor microphone

- Heart sounds which are synchronized with the ECG

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- Independent left and right sounds
- Bowel Sounds
- Heart, lung and bowel sounds auscultated with a stethoscope.
- Independent volume adjustment

-PATIENT & SCENARIOS

- Should be delivered with pre-programmed patients. System should have patient editor software to edit/ modify preconfigured patient profiles or to create new patient profile.
- Should be delivered with pre-programmed scenarios. System should have scenario editor software to edit/ modify preconfigured scenarios or to create new scenario.
- At any point during a simulation session it should be possible to capture the current state of a patient which can be used as a new patient.
- Should be capable of running multiple patients simultaneously to create multiple patient care simulations

-EVENT LOG:

1. The simulator must include physiological, pharmacological event data that is logged and timed stamped.
2. The log must automatically calculate and log the following items:

- Alveolar and blood gases
- Cardiac Output
- Heart rate
- SPO2
- Invasive blood pressure
- Hematocrit and hemoglobin values
- Temperatures

3. The event long must be able to be saved and printed.

-CONTROL SYSTEM:

Control system should be comprised of

- Instructors wireless remote control capable driving all software programme
- Instructor wireless remote control must be expandable for future software up-gradation.

Web-based Digital Video & Audio Management System for Recording, Debriefing, Assessment and Evaluation

- Web based digital video and audio management system for integration and synchronization of simulation exercise including physiological data logs, event logs, pharmacology data logs and patient monitoring data from multi simulators providing complete record for debriefing assessment and evaluation.
- Should provide observation of simulation exercise and Ability to visualize and control the system from a central location.
- The system shall permit X-Rays to be inserted into simulations via stimulated patient monitor
- Should provide of capturing and control of simulation sessions and monitor and control playback in sync with any simulation event, data point or instructor's annotation during debriefing session or when a simulation is taking place

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- The system should include:
- Support for real-time video and audio streams
- Record and replay the entire simulation for facilitated debriefing and after-action review
- Broadcast simulation to internal and external locations
- Place-shift and time-shift the simulation recording
- Room-centric recording to follow action in a specific location
- Observe and switch between multiple camera views (real-time, time-shifted) with zoom in/out capability

Supplied complete with control console, camera, Ethernet network cables, digital audio video recording system.

Software Specifications

1. It should have the facility for Live broadcasts in any browser with as little as half a second of latency.
2. Should have Up to 3 concurrently displayed and synchronized camera streams or 2 cameras and 1 simulator in each room.
3. Should have facility for Widescreen HD video broadcast and recording, full screen mode.
4. On-screen ePTZ controls: click on image to pan and tilt, drag image to zoom in and out ; from multi or single room views. View any configured room securely using SSL certificates
5. It should be able to Connect any simulated or real patient monitor for capturing and broadcasting HD screen image
6. Optical character recognition to turn the video signal from monitor into real-time data streams for visual trend charts and searchable physiological data
7. Use predefined layouts or define your own for identifying key captured values on the connected screen Supports remote site configuration
8. Define pre-set camera angles, which can be jumped to instantly during live action Pause live or recorded view and continue where you stopped ("time shifted live view")
9. Manually start/stop recording or set recording to occur based on a schedule or on user actions
10. Access and control all recorded videos on one page (debriefing, deleting, downloading, renaming or reassigning videos)
11. Generate and export custom reports covering both group and individual performance, or use one of the many predefined report options
12. Give learners access to their reports at home or on campus
13. Export data from server to work with outside of system
14. Review faculty and standardized patient performance reports for quality assurance and consistency
15. Track the use of simulation center resources (Rooms, Simulators, Personnel, etc.) by client. Generate reports quarterly/by semester/yearly
16. Allow faculty to submit booking requests for specific rooms/resources within the simulation center, to be managed be center administration
17. Follow Learner progress in key skill areas throughout their career within your program

-The system shall be supplied with Stethoscope, Laryngoscope, LMA, Patient bed with IV stand, Resuscitation cart, Resuscitator Bag.

-Simulator must be includes the following leaving modules:

-EMS V

- Abdominal Pain
- Basic Assessment
- Closed Head Injury
- Epiglottitis
- Femur Fracture
- Multi Trauma

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- Sepsis
- Supraventricular Tachycardia
- Upper Respiratory Infection
- Croup

-PEDIATRIC ADVANCED LIFE SUPPORT (PALS)

- In accordance with AHA guidelines
- Asthma Attack
- Asystole
- Bradycardia
- Ingestion
- Motor Vehicle Crash
- PEA
- Septic Shock
- Shock
- Supraventricular and Ventricular
- Tachycardia
- Ventricular Fibrillation

-PEDIATRIC EMERGENCIES

- Burn Injury
- Electrocution
- Envenomation
- Gunshot Wound
- Meningitis
- Methamphetamine Exposure
- Submersion Injury
- Traumatic Brain Injury

-PEDIATRIC NURSING

- Abnormal Variations in Heart Rate in a Six-Year-Old Patient
- Acetaminophen Poisoning
- Amputation Secondary to Osteosarcoma
- Asthma Attack in the PediatricPatient
- Care of a Young Child with Meningitis
- Cystic Fibrosis
- Diabetic Ketoacidosis and Pneumonia
- Fluid and Electrolyte Imbalance
- Foreign Body Aspiration
- Fractured Radius withCompartment Syndrome
- Near Drowning
- Postoperative Care with Complications: Seizures and Allergic Reaction
- Renal Dysfunction Secondary to Acute Streptococcal Glomerulonephritis
- Septic Pediatric Patient Secondary to a Ruptured AppendiX
- Terrorism by Chemical Agent
- Traumatic Brain Injury

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Advanced Neonatal Simulator

Mannequin:-

- Should be wireless and tetherless simulator representing newborn to one month baby.
- Should have interchangeable genital.
- Should be able to facilitate bleeding
- Should have inbuilt battery backup.
- Should have wireless instructor control.
- Mannequin should not weigh more than 7 lbs
- Should allow neonatal training needs from well newborn care to S.T.A.B.L.E., NRP and PALS training
- Should be available in three physiologically modeled patients to support simulated scenarios at different post-delivery time periods

1. Post-delivery (Delivery to two minutes)
2. Newborn (2 minutes to 2 days)
3. Infant (2 days to 1 month)

- Should have realistic articulation in -neck, jaw, shoulders, elbows, hips, knees.

Should have following features:-

A. Airway/ Respiratory system

- Realistic anatomical correct airway
- Bag-valve-mask (BVM) ventilation
- Orotracheal and nasotracheal intubation
- Laryngeal mask placement (LMA)
- Oral and nasal pharyngeal insertion (OPA, NPA) »
- Tracheostomy care and management
- Right main stem intubation with detection
- Laryngospasm (manual control)
- Stomach distention with esophageal intubation
- Spontaneous breathing
- Bilateral and unilateral chest rise
- Lung auscultation sites on anterior chest
- Upper airway sounds of crying, hiccup, gasping, grunting, stridor, wheezing
- Unilateral needle decompression
- Chest tube placement
- Substernal retractions

B. CARDIOVASCULAR SYSTEM

- 3-lead ECG monitoring with real equipment
- 12-lead dynamic ECG display
- Defibrillation, cardio-version and pacing using live equipment with simulated defibrillator (external defibrillation box)
- Heart auscultation

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C. Circulation

- Bilateral brachial and femoral pulses
- Umbilical pulses
- IV access at antecubital, foot and scalp
- Umbilical catheterization and infusion
- Unilateral tibial IO access
- Bilateral IM/SQ injections
- Urinary catheterization
- Peripheral arterial catheter insertion
- Subclavian catheter placement
- Circumoral cyanosis

D. CPR

- Compliant with 2015 AHA Guidelines
- CPR compressions generate palpable pulse, blood pressure, waveform and ECGartifacts
- Realistic chest compression depth and resistance
- Metrics detecting hand placement, rate and depth of compressions, recoil, ventilations and ventilation to compression ratio
- CPR metrics now visible on the patient monitor so learner can see their performance

E. Sounds

- Normal and abnormal heart, lung and bowel sounds
- New RFID technology
- Pre-recorded vocal sounds

F. Preconfigured Scenarios

- Infant Code (one-month old PALS)
- Neonatal Abstinence Syndrome
- Neonatal Code (newbornNRP)
- Pneumothorax
- Poor Perfusion

Should be supplied with:-

1. Wireless newborn simulator- 1 nos
2. Simulated defibrillator- 1 nos
3. Simulated stethoscope – 1 nos
4. Patient monitor – 1 nos
5. Inbuilt scenarios – 5nos

MATERNAL FETAL SIMULATOR

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- Maternal Fetal Simulator complete with anatomically realistic mother and fetus for comprehensive training in prenatal care, labor and delivery, and postpartum care.
- The Maternal Fetal Simulator should be wireless, high fidelity simulator with an automated delivery mechanism and maternal aesthetics like a real patient.
- The birthing mechanism should be noiseless for realistic labour.
- Should have validated integrated maternalfetal physiological and pharmacological modeling.
- All maneuvers& interventions should result in appropriate patient response automatically based on underline physiology of patient without any input from the instructor
- Birthing simulator should include a birthing fetus and a second fetus especially designed for Leopold's maneuvers without connection ports on the head or buttocks.
- Should be fully wireless with onboard fluids, pneumatics, and electrical systems
- Should include software licenses to support scenario writing and editing on any computer
- Maternal fetal simulator should have voice linked to labour and should allow upload of voice files in any local language
- Simulator should support full maternal code as a nongravid patient and should be supplied with nongravid abdomen and scenarios for the same.
- Simulator should be compatible with mixed reality oculus HoloLens
- Simulator should real-time, interactive 3D holograms of anatomy as well as responsive mother-baby physiology
-

Simulator should have following features

- Should have realistic birth canal with vulva/perineum supporting accurate fetal descent and rotation
- Should provide Multiple Birthing Positions: lithotomy, sitting, and allfours
- Should allow vaginal examinations for evaluation of the cervix, fetal station, and position
- Should have palpable uterine contractions which can be detected by palpating the fundus
- Should have facility to allow Instructors to control the rate and duration of contractions
- Birthing fetus should not have any connection port at the head or buttocks for realistic presentation during both vertex and breech deliveries
- Fetus/baby should have open mouth for meconium removal & cyanosis treatment
- Should have a customized fetus for Leopold's Maneuvers with hard head and soft buttocks
- Should support and detect McRoberts Maneuver
- Should have observable pelvic which should be registered in event log
- Should support and detect suprapubic pressure with palpable symphysis pubis
- Obstetric maneuvers like McRoberts Maneuver, suprapubic pressure rotation of anterior and posterior shoulder should be detected and logged in event loop to debriefing purposes
- Should simulate realistic shoulder dystocia due to realistic pelvic bone movement and it should be resolved once posterior arm is extracted
- Internal rotations with detection

a Should support delivery of posterior arm during shoulder dystocia
b Should allow Zavanelli maneuver with detection and logging in event log
c Trendelenburg position with detection and logging in event log
d Left lateral tilt with detection and logging in event log
e Vertex and breech delivery with no exposed metal parts

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- Should have Fetal heart sounds – 4 locations based on fetal presentation
- Should have Articulated fetal body neck (with lateral neck movement), shoulders, elbows, hips, and knees
- Should have clinically accurate fetal size with tactile realism – 5th percentile on the WHO growth chart
- Fetus with palpable fontanel and sagittal suture
- Should allow Forceps application
- Should allow Vacuum extraction without fetal cap
- Should provide fetal neck traction graph to give real time feedback on force applied during vacuum or forcep delivery
- Should allow Fetal airway suctioning
- Fetus should have audible cry upon delivery
- Should display predicted 1minute and 5minute APGAR scores based on integrated maternal fetal physiology
- Should simulate postpartum hemorrhaging, including Class III hemorrhage
- Should allow for assessment of uterine atony (Contracted vs. Boggy Uterus)
- Should have facility bimanual compression and uterine massage detection
- Should exhibit

a Uterine blood released upon massage
b Uterine massage should automatically decrease rate of blood flow
c Uterine massage compression effect
d Uterine reversion

- Should support placing an Intrauterine balloon
- Umbilical cord can be cut and clamped
- Episiotomy should be possible
- Should have Intact/fragmented placenta with realistic color, texture and flexibility, placenta can be delivered with gentle traction
- Should have an epidural port for realistic infusion and aspiration
- Should allow recognizing sign for emergency Csection for team training of C Section.

Mannequin should have following clinical features

a. Respiratory

- Manikin should have realistic upper airway with airway management
- Should have Advanced lungs with mechanical ventilation support
- Should allow use of airway devices such as LMA
- Should Support endotracheal tubes, nasalpharyngeal and oropharyngeal airways
- Should display spontaneous breathing
- Should have bagvalvemask
- Should exhibit lung sounds: anterior and posterior
- Should have realistic chest excursion & Exhalation
- Should allow positive pressure ventilation
- Should have advance CPR matrices

b. Circulatory System

- Should support real 4lead ECG that can be connected to simulator
- Should display 12lead ECG simulated in software
- Should have bilateral pulses: carotid, radial, and dorsalispedis; with controllable pulse strength

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c. Cardiovascular

- Should allow Chest compressions resulting in appropriate physiological changes.
- Should have advanced CPR metrics to measure the consistency of compressions and ventilations, as well as coronary and cerebral perfusion. Hand placement, chest recoil, and left lateral tilt should be detected and logged by the operating system.
- Should support electrical therapy (defibrillation)
- Should allow Bilateral NIBP measurement
- Should have realistic Heart sounds linked to the physiology of the patient.

d. Nervous System

- Should simulate seizures with rhythmic movement of arms, rapid blinking, and jaw movement
- Should have Reactive pupils
- Should have facility to change the colour according to condition of the patient like yellow for jaundice, red in case of blood clot through inbuilt digital eyes with system software
- Should have Blinking eyes
- Should have live and prerecorded speech and should also have ability to import customized vocal sounds into system software

e. Fluids

- Should have inbuilt postpartum bleeding tank atleast (1,800 ml)
- Should have Bilateral IV arms with realistic flashback
- Should have Urinary catheterization

Patient Profiles & Scenarios

- Should be supplied with preprogrammed patient profiles with system software to write patient profiles as per training needs
- Should be supplied with preprogrammed clinical scenarios (at least 20 nos.) with system software to modify existing scenario & write new scenarios as per training needs
- Preprogrammed clinical scenarios for gravid patient should include:

a Normal delivery
b An instrumental vaginal delivery
c Fetal Tachycardia due to Maternal Pyrexia
d Maternal cardiorespiratory arrest
e Fetal central nervous system depression by narcotics given to the mother
f Eclampsia
g Major postpartum hemorrhage due to uterine atony
h Breech delivery
I Shoulder dystocia
j Umbilical cord prolapse

- Preprogrammed clinical scenarios for nongravid patient should include :

a Chronic Heart failure exacerbation
b. Acute Respiratory Distress Syndrome

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c Sepsis with Hypotension
d. Brain Attack with Thrombolytic Therapy
e Motor Vehicle Collision with Hypovolemic Shock

Should be supplied complete with

a Wireless maternal mannequin 01 no.
b Software License 01 no.
c Fetus for Leopold's maneuvers 01 no.
d Abdominal for labor 01 no.
e Abdominal for Post Labor 01 no.
f Static cervices for vaginal examination 01 set
g Instructor wireless tablet – 01 no.
h Simulated CTG Monitor – 01 no

LAPAROSCOPY TRAINING SIMULATOR

Basic Features :

1. Platform should be designed to accommodate laparoscopic training for General Surgery and can also be used for training of other medical specialties such as arthroscopy, gynecology, and urology for future training need
2. Must have Patient positioning: Anatomically accurate abdomen model is rotatable allowing to practice different patient positions (e.g. Trendelenburg, anti-Trendelenburg). Rotation of abdomen produces correct physical behavior of the organs inside simulation.
3. Must allow trocar and instruments placement: Trocars and instruments can be freely placed on the abdomen model, allowing the trainee to learn instrument handling with different trocar placement.
4. Must allow team Training: Laparoscopic simulator should allow for a realistic OR team setup as the entire team can surround the abdomen model and learn how to collaborate in limited space.
5. Abdomen model must provide at least 17 trocar portals for entry of various instruments. The trainees can use any ports of their choice /requirement.

General offering

1.1 The laparoscopy simulator should be virtual reality simulator specifically designed to:

- train diagnostic skills
- train key surgical skills
- train general surgery skills
- contain healthy anatomies as well as various pathologies.
- train handling of surgical complications

1.2 The laparoscopy training simulator should be based on a platform designed to:

- support an anatomically accurate abdomen rubber model
- be extendable to further future applications
- be extendable to further disciplines, such as gynecology including reproductive medicine, arthroscopy and urology
- offer the possibility to change between the laparoscopy module and modules for further disciplines within less than 5 minutes

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1.3 The laparoscopy training simulator should be based on force feedback provided by the trocars and instruments that can be freely placed on the abdomen model.
1.4 Should have a highly realistic high-fidelity virtual reality image stream is provided containing all relevant anatomical structures, pathologies and complications.
1.5 The simulator should offers an efficient training approach focused on short training sequences teaching transferrable key skills.
1.6 The simulation must allow for team training with the entire team surrounding the patient and practicing the real OR team setup. Team training takes place simultaneously using the same anatomically accurate abdomen model.

System platform requirements

1.7 Should have an application specific mobile and height adjustable system cart provided with a height adjustable touch screen computer monitor, lockable PC security cabinet, integrated wide input range (100V-240V / 50-60Hz) and main connections. The integrated touch screen is:

- Rotatable in 3 axes (sideways, up-down, front-back)
- At least a 27' format
- Has integrated speakers

1.8 Cart should be electrically height adjustable to allow for an ergonomic training position.
1.9 Cart should allow for easy access to audio and HDMI output ports.
1.10 Cart contains holders to store the instruments during simulator use. It is possible to store the instruments without disconnecting them.
1.11 Cart should have lockable casters.
1.12 A multi-use transport case should be available for the simulator for safe transport and easy loading.
1.13 System should contains a high-end PC with:

- Minimum 3.7 GHz CPU
- Minimum 2x 512 GB SSD
- Minimum 2x High performance graphics cards
- Minimum resolution of 2560 x 1440 pixels

1.14 System should be CE certified (IEC 61010)

Patient Model requirements

1.15 Laparoscopy simulator should include a realistic abdomen rubber model.
1.16 Abdomen model must be rotatable in different positions (for example Trendelenburg, anti-Trendelenburg) according to the simulated procedure.
1.17 Abdomen model should provide at least 17 trocar portals for entry of instruments.
1.18 Change of trocar and instrument positions should be possible without restarting the simulation.
1.19 Laparoscopy simulator must allow to freely change position of instruments and trocars during the case.

Instrument requirements

1.20 No configuration or calibration should be required by the user.

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1.21 Should have realistic laparoscopic instruments with electromagnetic tracking are used, maintaining feel and functionality.
1.22 Should have Instruments and trocars can be freely used without external limitations or restrictions on range of movement or orientation.
1.23 Should have Haptic feedback should be provided by trocars, laparoscope and working instruments: multidimensional haptic feedback based on directional force feedback (e.g. insertion, retraction) and procedure-based feedback (e.g. organ collisions, cutting, clip placements).
1.24 Laparoscope camera must support 0 degrees and 30 degrees angled optics.
1.25 Laparoscope camera should support zoom and focus functionality.
1.26 Laparoscope camera must support haptic feedback upon organ collisions.
1.27 Realistic Laparoscopic instruments must be provided with the system such as Laparoscope, Haptic Trocars, Foot Pedal for electro surgery and laparoscopic holder.
1.28 The working instruments should be based on real laparoscopic instruments and open and close like original instruments with a simulated tip.
1.29 The system must provide electrosurgical instruments, including a realistic OR foot pedal to activate cutting and coagulation.
1.30 Instruments are easily interchangeable without the need to restart the simulator.
1.31 Should allow single training, the camera position can be frozen, and a virtual camera assistant can be activated

General Software specifications

1.32 The software platform should be capable of handling or upgrading to multiple diagnostic and surgical modules.
1.33 Entire abdomen anatomy should be simulated, including correct physical behavior of all organs.
1.34 Simulated organs shift with positioning of abdomen model.
1.35 Should visually mimics a real application as closely as possible with photorealistic graphics, and including features such as acoustics, tactile feedback, blood loss, etc.
1.36 The simulation must include efficient and short training scenarios to learn the key laparoscopic skills in a realistic anatomical environment.
1.37 Acoustic feedback must be included from operating room background sounds and sound of instruments during operation.
1.38 Should contain the possibility to design own courses with own scoring based on all patient cases available in the simulator.
1.39 Should automatically creates certificates for users who did successfully complete courses.
1.40 Should contain surgical complications such as bad view and bleeding.
1.41 Should display outside view of the anatomical structure and the instruments:

- Outside view is customizable by the user by zooming and rotating the image via the touchscreen
- Outside view shows the instrument, trocars and patient positions as a didactic aid.

1.42 The simulator must measure, assess, and score trainees' performance. Established quantitative metrics, featuring procedure time, idle time, camera and instrument path lengths as well as patient safety relevant metrics such as time of instruments outside camera view or collisions of instruments with organs.
1.43 The simulator should contain and stores feedback reports after each procedure including screenshots and videos. All content of the feedback report including video, screenshots and measured metrics is exportable.
1.44 The system must generate printable feedback reports.
1.45 The system should can handle various users and store videos of the performances for each user with easy access for the administrator.

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Training Goals

1.46 The laparoscopy simulator should allow training of key surgical skills such as

-
  -
  - Patient and OR team positioning
  - Trocar placement
  - Camera navigation
  - Instrument triangulation and bimanual coordination
  - Understanding the anatomy
  - Recognizing important landmarks
  - Exposing and mobilizing important structures
  - Performing different dissection techniques in a safe way
  - Safe use of electrosurgery

1.47 The laparoscopy simulator must allow training in reality-like conditions to ease the transfer of skills into the OR. Training areas include

-
  -
  - The selection of the correct patient position and trocar placement according to the simulated procedure.
  - The correct identification of important anatomical landmarks and pathologies.
  - The efficient and safe use of laparoscopic instruments.
  - Learning di ff erent resection and dissection techniques, as well as bleeding control and management of surgical complications.
  - Understand how to perform a diagnostic laparoscopic procedure in preparation for surgical interventions.

General Surgery Module Software Requirements

1.48 The General Surgery module for laparoscopy training must contain at least the following cases:

- Full diagnostic laparoscopy in a female patient
- Establishing the critical view for a safe cholecystectomy
- Cystic pedicle dissection and safe clipping
- Gallbladder resection using various techniques
- Control of hemorrhage in the liver bed
- Skeletonizing the appendix to prepare for ligation
- Vascular control of appendicular artery
- Diagnostic of an incisional hernia
- Lysis of adhesions to a hernia site
- Control of hemorrhage and leakage from cystic vessels

Essential Skills Module Software Requirements

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1.49 The Essential Skills module for laparoscopy training must contain at least 10 cases with a total of at least 20 exercises:

- Camera navigation cases (Image centering, horizon control, periscoping)
- Hand-eye coordination cases (Fine movement and triangulation)
- Grasping cases (Bi-manual coordination)
- Clipping cases (Precision clipping)

Cutting cases (Precision cutting)

Guidelines for development of skills lab at medical colleges

1. **The skills lab that fulfills the requirements of the outcomes in undergraduate curriculum should contain, at the minimum, the following:**
2. The skills lab should have a total area of at least 2000 sqft for 100 students, there must be a facility for minimum of 04 rooms (preferably 08) for examination of patients or standardized/ simulated patients.
3. The skills lab should be equipped with a facility for video recording and review of the interaction. This is vital for teaching communication skills.
4. A room for demonstration of skills to small groups,
5. A review or debriefing area,
6. Stations for practicing skills individually or in groups,
7. Trainers or mannequins required to achieve skills outlined in the competency based undergraduate curriculum document,
8. Adequate storage space for storage of mannequins and/or other equipment's.
9. A room for faculty coordinator, and for support staff.
10. Dedicated technical officer and support staff must be available .

Suggested facilities in Skill Labs (for 100 students) by the start of Phase 1 in all medical colleges by the NMC

PartTimetask trainer simulators/ models/ mannequinsfor:

- First aid, Bandaging,splinting;n=4
- Basic Life Support(BLS), CPR (CardioPulmonaryResuscitation)mannequin: n=4
- Varioustypesofinjections-Subcutaneous,Intra-muscular,Intra-venous;n=5
- UrineCatheter insertion;n=4
- Skin&Fasciasuturingn=5
- Breastexaminationmodel/mannequin
- GynecologicalexaminationmodelmannequinincludingIUCD(IntraUterine ContraceptiveDevice)Training model
- ObstetricsmannequinsincludingObstetricexamination,conductandmanagementofvaginaldelivery.
- Neonatal&Pediatricresuscitation mannequins
- Wholebodymannequins,Traumamannequin(Optional)

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Specifications

1. First aid, Bandaging, splinting; n=4

Technical Specification of Bandage model

- This simulator should have a male lower body structure, from the xiphoid to the lower limbs.
- It should have a clear body surface structure: umbilical, anterior superior iliac spine, external genitalia.
- It should have Dynamic A-Biotic Surfaces
- The external surfaces of equipment must have a A-biotic layer which continuously reduce the bacteria and microbes by 95% to prevent spread of diseases, without repeated use of chemicals.
- A-biotic surfaces should be based on technology that does not use any chemical sterilisation process. the process for sterilization of surfaces must be a mechanical one.
- All solutions required for maintaining the efficacy of the A-biotic Layer of the equipment's surfaces must be supplied along with equipment for the warranty period.
- The A-biotic surface must have a layer of micro mechanical surfaces capable of mechanically killing microbes and viruses.
- The Product catalogue must state that the solution used by it will not lead to mutation at surfaces and that the method to neutralise bacteria and fungus is a micro mechanical killing.
- There should be a digitised user manual available 24* with the system
- The digital user manual must be accessible 24*7 to those in close proximity to machine.
- The user manual must have all technical data and user must be able to perform functions such as finding keyword and saving screen shots on contents of the user mannual.

2. Basic Life Support (BLS), CPR (Cardio Pulmonary Resuscitation) mannequin: n=4

Technical Specification of Hi-Fidelity Basic Life Support (BLS) System with Full CPR Parameter Reporting and Analysis

1. The System should be suitable for conducting Comprehensive CPR Training with accurate, high fidelity real time digital feedback with a report on the analysis of tasks performed.
2. It should be possible to practice the Jaw thrust manoeuvre and it should require accurate head tilt-chin lift positioning to physically open the airway.
3. It should be possible to modify chest stiffness by adjusting an external slider at the back of the model without the need to either change springs or open the system.
4. Chest depth movement must provide for a physical movement in excess of 6.5cm and the springs should be warranted for atleast 1 million compressions
5. The system should work without batteries at all times.
6. Should have auto-calibration facility to determine the pressure on the chest and current position of the chest before start of compression activities and should store this information in the data file for each compression activity.
7. Should have facility to measure, record and continuously display real time colour coded bars of Information regarding quality of Chest Compressions including rate, depth, degree of release /non release, too deep compressions and hitting the bottom to enable the instructor and student take immediate corrective action.
8. The System should show the degree of non-release of the chest for each chest compression and this should be available in a report.

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9. The System should display a graph showing the real time ongoing effect of the quality of CPR being performed and of interruptions to compressions on the state of cerebral perfusion.
10. Should have facility of measurement and objective real time display of information for the volume and timing of ventilations and the rate of the air flow for all ventilation activities.
11. It should provide Real Time Visual Colour Display of the Rate of flow of air into the lungs and display accurately
12. It should also provide accurate measurement and display of the volume of air flow in litres or cubic centimetres for each ventilation and the Interval between Ventilations during Rescue Breathing and display.
13. It should have a self-test mode where the visual Feedback can be turned On or Off and this state must be reflected in the saved data file.
14. It should have a feature to turn on and off a Metronome (an audio feedback to help with timing during activities).
15. It should have a feature to modify the training parameters such as number of cycles and number of compressions to suit particular training needs.
16. It should be possible to use the System with mechanical CPR machines
17. it should be possible to install the software application on a normal windows lap top computer or multiple windows laptops without any additional license cost/user fee.
18. System should provide a consolidated training report in excel as well as chart form . It should be possible to monitor and collect reports from multiple training sites and email the same from controller.
19. It should have facility to create different user/student accounts for accurate data storage and analysis
20. Should be supplied complete with Torso with Jacket, laptop controller, operation and reporting software, disposable head bags-20 nos
21. Optional Arms and Legs to replicate a Full Body must be available

3. Various types of injections- Subcutaneous, Intra-muscular, Intra-venous; n=5

Technical Specifications of Various types of injections- Subcutaneous, Intra-muscular, Intra-venous

- Should have three different injection techniques—intramuscular injection, hypodermic injection, and IV injection
- Students should be able to practice all the three different injection techniques intramuscular injection, hypodermic injection, and IV injection with a single model.
- Should be able to practice IV injection in the median ante brachial vein and opisthenar vein, allowing a total of four different injection techniques

Should have following Features

- Silicone should be used in the skin and other main parts, and so the look, feel, and puncture sensation should be similar to those with a real human body, resulting in more realistic practice.
- Should allow four different techniques to be practiced with a single model

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- Movable shoulder, elbow, and wrist, a realistic body position for each technique should be reproduced.
- The skin (silicone) should withstand many punctures without leaving visible needle holes, and so can be used for a large number of practices.
- Should allow Blood removal with a vacuum blood collection tube or syringe.

Structure of the blood vessel should have following features

The median antebrachial vein

1. Silicone gel part

- The mock blood vessel should be enclosed in silicone gel. It should be possible to simulate the feeling that the blood vessel has slipped away or been punctured when a needle is inserted.

2. Mock blood Vessel

- The mock blood vessel should make visual examination and palpation of the blood vessel easier than the blood vessel in the silicone gel part.

Securing a needle

The skin should provide a better adhesive surface for tape than previous skins, making it possibly to fix the needle securely in place. The skin should be made of silicone rubber.

Practical Training

Hypodermic injection

- The injection site can be ascertained.
- The injection site can be confirmed with realistic frame work (bone).
- The sensation provided when injecting via a needle is similar to that provided by real human skin.
- A series of techniques such as hypodermic needle injections of medicine can be practiced.
- Injected liquid can be discharged through a drainage tube.

Intramuscular Injection

- The injection site should be confirmed with realistic frame work (bone).
- The sensation provided when injecting via a needle should be similar to that provided by real human skin.

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- All the series of techniques such as hypodermic needle injections of medicine should be practiced.
- Injected liquid should be discharged through a drainage tube.

IV (Intravenous) Injection

- Vein should be confirmed visually from the surface of skin.
- Blood vessel tube should be covered with silicone gel and this makes it feel more like real human skin.
- With special coating on the silicone skin, surgical tape can be attached to the skin.
- A series of techniques such as hypodermic needle injections of medicine can be practiced.
- Injection site and skin can be replaced easily.
- Should have simulated blood which has color and viscosity similar to that of real blood and can be easily washed off with water.
- Simulated blood circulation is easily performed by manual operation.

Specifications:

Weight

Arm 3 Kg (approx.) or less

Stand - 2 Kg (approx.) or less

Accessories to be supplied with each equipment:

- Main Body – 1 no.
- Arm Skins (Upper Arm) – 1 no.
- Irrigator- 2 no.
- Pinch cock - 2 no.
- Simulated blood (500) -1 no.
- Elbow Rest – 1 no.
- Syringe 50 ml – 1 no.
- Drainage tube – 1 no.
- Stand – 1 no.
- Storage bag – 1 no.\
- Baby powder – 1 no

4. Urine Catheter insertion; n =4

1. Technical Specifications of Male Catheterization Model

- It should be a life like, anatomically correct simulator for practicing urethral catheterization perineal care and enema by water.
- It should be used independently with the detachable and interchangeable male organs.
- The balloon catheters should be inserted in the correct perpendicular penis position. Penis should have retractable foreskin.

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- It should have provision for urine or water flowage to check the catheter placement at correct position in urinary bladder.
- The urinary bladder should facilitate insertion of balloon catheter.
- Enema should be done in lateral position in which tube tip should be blocked by inner walls of rectum when insertion is very deep.
- The bladder should be compressible for discharging residual urine.
- Insertion and indwelling of balloon catheter as well as meatus urethra finding should be done

2. Technical Specifications of **Female Catheterization Simulator Model**

- It should be a life like, anatomically correct simulator for practicing urethral catheterization perineal care and enema by water.
- It should be used independently with the detachable and interchangeable female organs.
- It should have provision for urine or water flowage to check the catheter placement at correct position in urinary bladder.
- The urinary bladder should facilitate insertion of balloon catheter.
- Enema should be done in lateral position in which tube tip should be blocked by inner walls of rectum when insertion is very deep.
- The bladder should be compressible for discharging residual urine.
- Insertion and indwelling of balloon catheter as well as meatus urethra finding should be done

5. Skin & Fascia suturing n=5

Technical Specifications of Skin & Fascia Suturing modal

- Should be suitable for training in simple suture.

- It should be light in weight.
- The external surfaces of equipment must have a A-biotic layer which continuously reduce the bacteria and microbes by 95% to prevent spread of diseases, without repeated use of chemicals.
- A-biotic surfaces should be based on technology that does not use any chemical sterilisation process. the process for sterilization of surfaces must be a mechanical one.
- All solutions required for maintaining the efficacy of the A-biotic Layer of the equipment's surfaces must be supplied along with equipment for the warranty period.
- The A-biotic surface must have a layer of micro mechanical surfaces capable of mechanically killing microbes and viruses.
- The Product catalogue must state that the solution used by it will not lead to mutation at surfaces and that the method to neutralise bacteria and fungus is a micro mechanical killing.
- There should be a digitised user manual available 24* with the system

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- The digital user manual must be accessible 24*7 to those in close proximity to machine.
- The user manual must have all technical data and user must be able to perform functions such as finding keyword and saving screen shots on contents of the user mannual.

6. Breast examination model /mannequin

Technical Specification of Breast examination model / mannequin

- This simulator should be a soft which gives life like feeling.
- This simulator should allow training in differentiation of four typical breast lumps.
- A tumer with dimple sign
- A cancer with skin depression.
- Fibroadenoma
- Mastopathy
- It should have bony anatomical landmarks like; palpable clavicle and ribs embedded under the soft breast tissue.
- It should be supplied in the box.
- It should be used for breast self examination.
- It should be approxW20 X D28 X H15 cm.
- It should be light in weight.

7. Gynecological examination model / mannequin including IUCD (Intra Uterine Contraceptive Device) Training model

Technical specifications of Gynaecological examination model Training Model

1. Simulator for comprehensive training of physical Vaginal Examination and evaluation of the performance of the student
2. Should be made up of Real life like material resembling real life characteristics of the living body. Cervix and other structures should give real life like feel
3. It should have 3-dimensional sensors which will be attached to index and middle fingers enabling to show images of actual movement of fingers inside the vagina when practicing vaginal examinations
4. It should provide the images of actual finger movements inside the vagina when practicing vaginal exams.
5. Should provide Measurement and display of distances between the two fingers and Distances moved by the fingers
6. Should also display Ischial spines connecting line.
7. 3-Dimensional images should be freely movable on the computer for checking in any direction.
8. It should be able to evaluate Bishop's Score from late stage of pregnancy to the beginning of Labor.

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9. Should have interchangeable uterus models with varying degrees of dilation for adjusting fetal head engagement allowing assessment of the progression of labor by vaginal examination
10. Should have the facility to vary the positions of sagittal sutures and posterior fontanel to gauge the rotation of fetus head
11. It should have animated display of 3-dimensional Rotation of the fetus at the time of delivery
12. It should be possible to view the fetus on screen from eight different directions in zoom in and zoom out mode. Orientation of the fetus on screen should also be selectable to match actual fetus model.
13. It should be possible to turn on/off the display of pelvis, fetus, uterus, fingers and station line with the software
14. System should be supplied with base for securing main body and the table
15. It should be supplied with product software and product License and sensor tracker.

8. Obstetrics mannequins including Obstetric examination, conduct and management of vaginal delivery.

Technical Specifications of Obstetrics mannequins including Obstetric examination, conduct and management of Vaginal Delivery

1.
    1. A total simulator for demonstration for breech birth, C-Section delivery, episiotomy, and fetal palpation
    2. Should be Removable diaphragm end plate
    3. Should be Removable stomach cover for manual positioning of fetus
    4. Should be Life-size pelvic cavity with all major anatomical landmarks
    5. Should have Ultra-soft vulval insert for episiotomy exercises
    6. Should have Simulated dorsosacral position for realistic delivery technique
    7. Should have features of removable end-plate for insertion of automatic birthing system; removable cervices automatically dilate as labor progresses; advance and rotation of fetus through birth canal; crowning of fetal head; manipulation of the vulva to pass the forehead, nose, and ears; syringe mouth and nose, rotation of the shoulders to enable correct delivery technique of neonate; birthing fetus; and 2 dilating cervices
    8. Forceps can be used during simulation
    9. The life size full body pregnancy simulator should have the provision of showing the delivery in 4 positions: Supine, Hands and knee, Lateral and free style. The manikin should have joint less ankle for achieving realistic delivery positions
    10. The simulator should be suitable for providing comprehensive training in external examination of pregnant women , internal examination during stages of delivery , obstetric assistance ,

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perineal suture of birth canal lacerations, palpations of the uterus fundus and breast care procedures

11. Should have obstetric abdominal palpation model representing 36th-40th week of pregnancy allowing visual diagnosis , palpation and abdominal measurements according to four type of Leopold's maneuver
12. Should be supplied with Two fetal models one with inflatable amniotic sac having fetal heart beat and the second fetus for obstetrics practice

Advance Birthing Simulator with PPH

- Normal delivery of umbilical cord and placenta
- Palpation and assessment of fetal position and presentation
- Diagnosis of all normal and abnormal fetal positions and presentations (like face, neck, or brow) to represent routine and difficult deliveries
- Intrauterine manipulation of fetus
- Shoulder dystocia demonstration and management
- Breech deliveries (including complete, footling or incomplete, and frank breech presentation)
- Palpation of fetalfontanelles features
- Complete and incomplete placenta birth
- Demonstration of placenta previa: total, partial, and marginal
- Prolapse of umbilical cord
- Nuchal umbilical cord
- Cesarean delivery with incision
- Artificial rupture of membranes (ARM or AROM, amniotomy)
- Clamping and cutting of umbilical cord
- Simulated suctioning of baby's mouth and nose
- Leopold maneuver
- Pinard'smaneuver
- Mauriceu-Smellie-Veitmaneuver
- Prague maneuver
- Woods maneuver
- Rubin

Birthing Simulator should offers the following features for effective obstetric teaching and training:

- Fully articulating fetus with open mouth, tiltable head, shoulder blade, and anatomical correct fontanelles
- Life-size adult female lower torso, anatomically correct landmarks like pelvis, pelvic cavity, and spine
- Manual birthing system to control rotation and speed of fetus delivery
- Easy to change position of fetus during birthing process including descend, flexion, extension, internal and external rotation, and restitution
- Uterus with correct positioning of fetus, inflatable to lift fetus for Leopold maneuver
- Easy change-out of parts through pin connections, no tools necessary
- Anti-slip base and handles for extra support on tables
- Belt for fastening to table or bed

Attachment PPH trainer module should be useful for training the following procedures:

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- Delivery of placenta, also incomplete
- Identification of the post-partum haemorrhage bleeding nature: uterus bleeding, cervix bleeding (rupture), vaginal bleeding (lesion)
- Visual estimation of the blood loss volume up to 1,5L
- Atonic uterus management
- Practice the fundal massage
- Practice bimanual compression
- Practice catheterization with catheter

Model should offer birthing stage training program with several natural attachments:

- Insert no. 1: Cervix closed (0.5 cm), level -2
- Insert no. 2: Cervix open 2 cm, level -2
- Insert no. 3: Cervix open 3 cm, half effaced, level -2
- Insert no. 4: Cervix open 5 cm, effaced, level -1
- Insert no. 5: Cervix open 7 cm, effaced, level -1
- Insert no. 6: Cervix open 9 cm, effaced, level 0

Birthing simulator should also have training for the episiotomy suturing and repair training:
With this module, taking care of the following birth injuries can be easily practised and demonstrated:

- Mediolateral left
- Medial or midline
- And much more thanks to the uncut insert

Features:

- Easy installation of the different inserts and of the module in the Birthing Simulator
- Two inserts feature medial episiotomy and mediolateral episiotomy with tears in the labia minora
- One insert is uncut and enables the trainee to choose the episiotomy location he wants to train
- Realistic soft skin
- Supports the use of real suture instruments
- Supports real sutures
- Durable reusable skin
- Made of latex-free material

Should be supplied with following items:

- Detachable, padded stomach cover with advanced insert for caesarian section
- Inflatable uterus insert for Leopold Maneuver including cover that can be cut for caesarian section
- Birth canal (portio, cervix, vulva)
- Fastening belt
- Lubricant
- Amniotic fluid and 100 inserts
- Assembly kit
- Fully articulating fetal baby
- Umbilical cord
- Placenta

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- PPH Trainer Module
- Blood reservoir 1,500 ml
- Blood reservoir stand
- Artificial blood concentrate (2 x 250 ml)
- 2 placentas
- 6 birth stage inserts
- Lubricant
- Carry bag

9. Neonatal & Pediatric resuscitation mannequins

Technical Specifications of Neonatal &paediatric resuscitation mannequins

- The simulator should facilitate training in variety of clinical skills in nicu such as resuscitation, tube feeding, venous access and umbilical care
- It should have following features
- Should have anatomy for skill training including ribs, bronchi, lungs, oesophagus and umbilicard
- Should have right limbs with veins for peripheral venous catheter insertion
- Should have BVM training with confirmation of bilateral /unilateral ventilation
- Should have soft and realistic umbilical cord with internal anatomy for training of an array of skill including venous line placement and blood sample collection
- Should have digestive structure to allow the tube feeding simulation including confirmation of feeding tube placement by auscultation
- Should have following training skills

1. Handling changing of the body position and cleaning
2. Palpation of the anterior fontanel
3. Umbilical catheterization and care
4. Tube feeding
5. IV access with transilluminator like basilica vein, vein of dorsal hand (right arm/hand), saphenous vein, popliteal vein (right leg/foot)
6. Airway suction (oral and nasal)
7. Airway management
8. BVM ventilation
9. Chest compression
10. Tracheal intubation
11. Secureing the tracheal tube in place
12. PI catheterization

Should be supplied with

a. New born manikin 1 no
b. Lubricant 1 no
c. Storage bag 1 no

10. Whole body mannequins, Trauma mannequin (Optional)
1. Technical Specifications of Whole body mannequins

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1. The model should have seamless arms and legs for realistic training without any joints in elbow, wrist, knee and ankle as in human beings.
2. It should be a life like multipurpose training manikin made of high quality silicone rubber with full articulation and anatomical landmarks .
3. The model should be suitable for training in appropriate patient handling to change the body position & providing support to transfer the patient to a wheel chair.
4. The manikin should allow training in assessment of chest and abdomen including abdominal inspection, palpation and percussion
5. The manikin should be suitable for training in infusion care and management including IV injection, infusion and securing of cannula & cannula caring at left median vein and left hand dorsal vein
6. Should be suitable for training in chest compression and airway management using normal and video laryngoscope . Successful ventilation can be confirmed by lung expansion and auscultation of chest
7. It should have facility to practice intradermal and intramuscular injection at shoulder , thigh and hips
8. Should allow changing the appearance of the simulator using interchangeable face masks, wigs and genitals for different simulation settings and realistic trainings.
9. The manikin should have realistic articulating jaw and removable dentures to facilitate oral care training including Brushing support, Oral massage & Denture care.
10. Patient should have a replaceable wig for hair combing and shampooing training.
11. Manikin should be suitable for training of students in following skills

b. Oral and nasal Tube feeding
c. Airway suction and Tube handling , Tracheostomy care and management
d. Oxygen inhalation
e. Oral and denture care
f. Perineal care , Vaginal washing
g. Bed bathing, hand and foot bathing, Change of clothes & diapers
h. Bedpan practice, stomach pumping , Bowel irrigation
i. Understanding on central venous port
j. Urinal catheter insertion
k. Enema, Suppository insertion, Digital disimpaction
l. Postmortem care
m. Patient handling for postural drainage
n. Pressure sores care
o. Stoma care, IV route care
p. Passive exercise, postural drainage
q. Fomentation , bandaging

12. It should have detachable legs for easy storage and transportation
13. The Manikin should be supplied complete with

Manikin, Denture, Female wig, Elderly wig, face mask-Female, Face mask elderly, simulated faces, Male and female Genitalia, Female genitalia for suppository insertion/ disimpaction, Simulated suppository, Injection pads for median vein, shoulder, Thigh and Hip, lubricant for airway and catheterization, Drainage pump for urinary bladder and rectum, Irrigation bag, Clothes for manikin.

2. Technical Specifications of Trauma manneguin

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- It should be suitable for simulating any kinds of traumas of body, the burned skin can be replaced.
- It should be able to simulating the different processes of wound nursing like washing, sterilization, hemostasis, enswathing, fixing and carrying.
- Manikin size should be compact and light weight.

High Fidelity Patient Simulator
SIMULATOR:

- Should have realistic aesthetic, easy to use, true mobility, wireless and tether less manikin.
- Should have Two Platforms (interchangeable genitalia) in one (Easy to convert from Female to Male) for teaching and training.

- 3D Holograms of anatomy using AR Simulator with HoloLens
- AR should offer visualization the connection between the physiology and external physical changes in a patient in emergency scenarios

NEUROLOGIC SYSTEM:

- Should have realistic eyes with reactive pupils to display different state of pupil : Normal , Dilated and Blown
- Mannequin should have simulated eyes to indicate patient condition for these ailments (Keyhole, Jaundice, Blood shot eye, Cataracts, Haemorrhage and Droopy Eyelid pupils)

ARTICULATION:

- Should have realistic articulation
- Should have range of motion in hips, knees, ankles, shoulders
- Should have Cervical motion for practice of patient stabilization

AIRWAY:
Should allow practice of following techniques:

- Bag valve mask (BVM)ventilation
- Orotracheal and nasotracheal intubation
- Endotracheal,retrograde and fiberoptic intubation and placement of various airway adjuncts
- Transtracheal jet ventilation
- Needle and surgical Cricothyrotomy
- Tracheostomy
- Right mainstem intubation and detection
- Stomach distention with esophageal intubation
- Laryngospasm

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BREATHING:

- It should have spontaneous breathing
- It should have bilateral and unilateral chest rise and fall
- It should have lung auscultation sites on anterior chest
- It should have upper airway sounds : Stridor and Gurgling
- It should allow practice of bilateral needle decompression

CPR:

- It should be compliant with 2015 AHA guidelines and ERC guidelines
- It should have realistic chest compression depth and resistance
- It should have CPR performance metrics that detects hand placement, rate and depth of compressions, recoil, ventilations and ventilation: compression ratio

IM MEDICATION ADMINISTRATION

- It should have three intramuscular sites: Deltoid and bilateral Vastuslateralis

CARDIAC:

- It should have 4 lead ECG monitoring with real patient monitor
- It should have 12 –Lead dynamic ECG display
- It should have Defibrillation, cardioversion and pacing using real equipment

CIRCULATION:

- It should have unilateral blood pressure measurement by auscultation and palpation
- It should have bilateral carotid and femoral pulses
- It should have unilateral radial and brachial pulses
- It should have variable pulse strength based on patient condition

SOUNDS

- It should have properties of auscultation of normal and abnormal heart ,lung and bowel sounds
- It should have simulated stethoscope utilizing radio frequency technology for auscultation of Heart, Lung and Bowel.
- It should have bidirectional audio communication between manikin and operator

VASCULAR ACCESS

- It should have Unilateral IV cannulation at antecubital and dorsum of hand
- It should have ultrasound training module insert for IV cannulation/PICC

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URINARY

- Should allow practice of urinary catheterization without fluids
- It should have interchangeable genitalia

Holographic Software:

- 3D Holograms of anatomy using AR Simulator with HoloLens
- AR should offer visualization the connection between the physiology and external physical changes in a patient in emergency scenarios
- Should have below Simulated Clinical Scenarios inbuilt in the system
- MyocardialInfarction
- PulmonaryEmbolism
- Sepsis
- Stroke
- SubduralHematoma
- TensionPneumothorax

System should include:

- Manikin -1 nos.
- Wireless simulated stethoscope -1 nos.
- Tablet with integrated software for running simulator and creating various patient scenarios -1 no.
- Simulated Eyes -1 no.
- Ultrasound training model insert for peripheral IV cannulation and infusion – 1 nos.
- Consumables 01 set (IV Hand Injecting Site, IV Elbow Injection Site, Deltoid Injection, Thigh Injection adult, Full Length Sleeve, Neck band, Crico Tape, IV Replacement Tubing Kit)
- Trauma kit: Blood Pumping System for Hyper-Realistic medical training system to simulate human arterial and venous haemorrhage in conjunction with simulated human injury products.The blood pumping system should be self-contained and allows for 4 simultaneous bleeds controlledbyawirelessfobwitha50-foot standoff.

  Each line should be controlled by the operator to simulate both venous and arterial bleeds. TheBlood pumping system should be supplied with 2 femoral sleeves (1 with and 1 without pants), 2brachial sleeves (1 with and 1 without bone), blast trousers, and 1 Gallon of blood concentrate forupto6 gallonsofreconstitutedblood.

Web-based Digital Video & Audio Management System for Recording, Debriefing, Assessment and Evaluation

- Web based digital video and audio management system for integration and synchronization of simulation exercise including physiological data logs, event logs, pharmacology data logs and patient monitoring data from multi simulators providing complete record for debriefing assessment and evaluation.
- Should provide observation of simulation exercise and Ability to visualize and control the system from a central location.

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- The system shall permit X-Rays to be inserted into simulations via stimulated patient monitor
- Should provide of capturing and control of simulation sessions and monitor and control playback in sync with any simulation event, data point or instructor's annotation during debriefing session or when a simulation is taking place
- The system should include:
- Support for real-time video and audio streams
- Record and replay the entire simulation for facilitated debriefing and after-action review
- Broadcast simulation to internal and external locations
- Place-shift and time-shift the simulation recording
- Room-centric recording to follow action in a specific location
- Observe and switch between multiple camera views (real-time, time-shifted) with zoom in/out capability

Supplied complete with control console, camera, Ethernet network cables, digital audio video recording system.

Software Specifications

1. It should have the facility for Live broadcasts in any browser with as little as half a second of latency.
2. Should have Up to 3 concurrently displayed and synchronized camera streams or 2 cameras and 1 simulator in each room.
3. Should have facility for Widescreen HD video broadcast and recording, full screen mode.
4. On-screen ePTZ controls: click on image to pan and tilt, drag image to zoom in and out ; from multi or single room views. View any configured room securely using SSL certificates
5. It should be able to Connect any simulated or real patient monitor for capturing and broadcasting HD screen image
6. Optical character recognition to turn the video signal from monitor into real-time data streams for visual trend charts and searchable physiological data
7. Use predefined layouts or define your own for identifying key captured values on the connected screen Supports remote site configuration
8. Define pre-set camera angles, which can be jumped to instantly during live action Pause live or recorded view and continue where you stopped ("time shifted live view")
9. Manually start/stop recording or set recording to occur based on a schedule or on user actions
10. Access and control all recorded videos on one page (debriefing, deleting, downloading, renaming or reassigning videos)
11. Generate and export custom reports covering both group and individual performance, or use one of the many predefined report options
12. Give learners access to their reports at home or on campus
13. Export data from server to work with outside of system
14. Review faculty and standardized patient performance reports for quality assurance and consistency
15. Track the use of simulation center resources (Rooms, Simulators, Personnel, etc.) by client. Generate reports quarterly/by semester/yearly
16. Allow faculty to submit booking requests for specific rooms/resources within the simulation center, to be managed be center administration
17. Follow Learner progress in key skill areas throughout their career within your program

-The system shall be supplied with Stethoscope, Laryngoscope, LMA, Patient bed with IV stand, Resuscitation cart, Resuscitator Bag.

*** All models should he quoted together as a Turnkey Setup.**

* Each modal (Low or High Fidelity) should have a module for training including objectives, methods and assessment. Module can also have hybrid models where real patients or standardized/simulated patients/computer simulations can be used.
* There shall also be space for CAL lab with adequate computers.

Requirement for the Nursing College Skill Lab with Specifications

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1. Advanced Nursing Manikin Adult

1. Should have contemporary aesthetic, Easy to Use, true mobility, wireless and tether less manikin
2. Should have Two Platforms in one (Easy to convert from Female to Male) for teaching and training Nursing students.
3. Manikin must have the following Clinical Skills Features :

• Anatomically accurate landmarks for realistic clinical skills practice
• Realistic articulation to promote proper patient handling
• Eyes and ears accommodate irrigation procedures or medication administration with Real fluids
• Open pliable nares allowing for nasal packing, insertion of nasopharyngeal airways, Nasal cannula and NGT placement
• Open mouth allows for realistic oral and denture care, placement, securing and care of oral airways, endotracheal tubes and gastric feeding tubes
• Realistic tracheostomy site allows for tracheostomy care and procedural suctioning with real fluids
• Chest tube port for care and maintenance
• Accommodates oxygen delivery methods with realistic chest rise with use of BVM
• Gastric lavage and gavage with real fluids
• Pulses include manually generated carotid pulse, (electronically generated brachial and radial pulse)
• ECG posts for lead placement
• Subclavian hole for placement of triple lumen catheter for care (without fluid administration)
• Configurable stomas for ostomy care and irrigation
• Urinary catheterization with real fluid return
• Enema procedures capable with real fluids
• IM injections and medication administration via deltoid, gluteal and vastuslateralis muscles.
• Articulating, easytomaintain, IV arm with replaceable IV pucks allowing for IV placement, Site care and fluid administration

Simulator should have Sounds and rhythms for patient diagnoses and assessment

• Various heart sounds, rates, rhythms and volume

- Enable/Disable ALL Heart sounds
  Select the Type (Normal, S3, S4, S3 and S4, Early Systolic Murmur, Late Systolic
  Murmur, Pan Systolic Murmur, Late Diastolic Murmur)
  Adjust the Volume
  Use the On/Off toggles, Type dropdowns, and volume sliders to adjust sounds in each
  quadrant (Mitral. Pulmonic, Aortic, Tricuspid)

• Programmable ECG generation
• Various lung sounds and controllable respiratory rate

- Enable/Disable ALL lung sounds
  Select the Type (Normal, Crackles, Diminished, Gurgling, Pleural rub, Rhonchi,

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Wheezing)
Adjust the Volume
Use the On/Off toggles, Type dropdowns, and volume sliders to adjust sounds in each quadrant

• Korotkoff sounds generated with programmable NIBP arm
• Various programmable bowel sounds

- Enable/Disable ALL bowel sounds
  Select the Type (Normal, Hypoactive, Hyperactive)
  Adjust the Volume
  Use the On/Off toggles, Type dropdowns, and volume sliders to adjust sounds in each quadrant

• Vocal sounds – software generated can be adjusted by the instructor
• Two way communication generation between manikin and caregiver

1. Simulator should be designed in such a way that it can upright at his/her own to perform realistic examination as in case of a real patient.
2. Simulator internal structure should be designed in such a way that all electronics part is separated completely from various fluid reservoirs so that to make more durable and easy for troubleshooting.
3. It should have facility to fill and drain all fluids externally without need of opening any part to refill fluids to make it ready for next training.
4. Simulator software should be embedded within itself so that it can be used with any available tablet or PC in the market.
5. Simulator must have the following inbuilt simulated clinical Experience for teaching and training students.

– Chronic heart failure exacerbation
– Gastrointestinal bleed secondary to esophagealvarices
– Skills validation
– Asthma management of patient in home care setting
– Postoperative care of the patient with complications: pneumonia
– Suctioning and tracheostomy care with hypoxia
– Basic assessment of the hip replacement patient
– Postoperative care of the patient with a ruptured diverticulum
– Seizure disorder and moderate learning disability
– Dementia and urinary tract infection in a patient with DNR orders.

Simulator must be supplied with:
Wireless Manikin with electronics
Tablet PC.
Conversion Kit from Female to Male.

2. Advanced Nursing Manikin Paediatric
The manikin should be of a 5year old
Should be ideal for training pediatric patient and nursing care as well as CPR.
Should have realistic face skin and molded hair, the articulating joints, and realistic hands and feet make for an impressive training experience.

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Features:

- Soft, lifelike faceskin with molded hair
- Eyes open and close in realistic eyesockets for ophthalmic procedures
- Articulating head, jaw, arms, and legs
- Jointed elbow, wrist, knees, and ankles
- Realistic hands, feet, fingers and toes
- Soft upper body skin over realistic molded internal organs
- Realistic chest cavity, with realistic internal organs for unparalleled CPR performance
- Detachable at waist for easy storage
- Bathing and bandaging activity
- Place nasal and oral gastric tubes
- Lavage/gavage
- Gtube placement
- Stomas for ileostomy, colostomy, and suprapubic exercises
- Removable internal tanks
- Interchangeable male organ
- Male and female catheterization
- Enema administration
- Placement of rectal suppositories
- Intramuscular injection sites in deltoid & upper thigh

Emergency Care Features

- Oral, nasal, and digital intubation
- Place OP/NP tubes
- Right/left mainstem bronchi
- Suctioning
- BVM
- Chest compression/rise
- Intraosseous infusion
- IV arm with variable, palpable pulses

Supplied with

- Tshirt and shorts
- Soft carrying bag
- Instruction manual

3. Advanced Nursing Manikin Infant

This advanced and incredibly realistic model with male and female features includes:

- Internal organs (heart, lung, intestine system, stomach, and bladder)
- Removable belly covering
- Interchangeable genital organs
- Soft ears
- Fully movable head, arms and legs

It allows trainees to practice both basic and medical infant care such as:

- Tracheotomy care
- Male and female catheterization
- Insertion of a tube into mouth or nose
- Enema insertion
- Femoral, gluteal intramuscular and subcutaneous injections
- Palpitation of fontanels

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4. MultiVenous IV Training Arms

- Should be an arm model to offer lifelike training for performing injection, infusion, venepuncture, phlebotomy, simulation and training of needle and catheters puncture procedure
- The model should have accessible veins include the median, basilica and cephalic.
- Model should possess realistic skin to offer close to reality experience
- After inserting the catheter correctly, students should experience a realistic flashback for placement confirmation
- Should have capability of ultrasound scannable for ultrasoundguided intravenous (IV) access
- Replacement skin should be very durable and can offer at least 3000 punctures before replacement
- Skin should be nonstaining
- Skin should be hypoallergenic
- Includes two nos. of 1000 ml bags to use for simulating an IV drip and blood flow through the arm.
- Model should have clear tubing to allow trainees to locate vessels solely by palpation

5. NG Tube Care

- Simulator should have been developed to aid with the instruction, training, and practice of vital tracheostomy skills and care for patients with respiratory conditions.
- The simulator should also offer skills of gastrointestinal care procedures through nasal and oral access.
- This simulator features realistic landmarks, trachea, esophagus, lungs, and stomach.
- For exceptional realism, hydroxyethyl cellulose can be mixed with water to simulate mucouslike fluids of a real patient.
- Fluid can be added to the lungs and stomach for realistic tracheostomy care and suctioning.
- The simulator also allows for the practice of dressing changes and cuff inflation.
- Other realistic procedures include: NG tube care, including insertion, irrigation, and removal gastric lavage and gavage feeding tube insertion and removal with the ability to practice feeding nasoenteric and esophageal tube care oropharyngeal and nasopharyngeal care and tracheostomy tube care Intubation using a laryngoscope blade and size 6.0 ET tube may also be practiced.
- The simulator should be designed to use size 6 tracheostomy tubes and a size 6 NG tube.
- Spraypump lubricant, a packet of hydroxyethyl cellulose, instruction manual, and hard carry case are included.

6. Adult Basic Nursing Manikin

1. Should have contemporary aesthetic, Easy to Use, true mobility, wireless and tether less manikin
2. Should have Two Platforms in one (Easy to convert from Female to Male) for teaching and training Nursing students.
3. Manikin must have the following Clinical Skills Features :

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• Open mouth allows for realistic oral and denture care, placement, securing and care of oral airways, endotracheal tubes and gastric feeding tubes
• Realistic tracheostomy site allows for tracheostomy care and procedural suctioning with real fluids
• Chest tube port for care and maintenance
• Accommodates oxygen delivery methods with realistic chest rise with use of BVM
• Gastric lavage and gavage with real fluids
• Manually generated carotid pulse
• Subclavian hole for placement of triple lumen catheter for care (without fluid administration)
• Configurable stomas for ostomy care and irrigation
• Urinary catheterization with real fluid return and vaginal douching can be performed.
• Enema procedures capable with real fluids
• IM injections and medication administration via deltoid, gluteal and vastuslateralis muscles.
• Articulating, easytomaintain, IV arm with replaceable IV pucks allowing for IV placement, Site care and fluid administration

4. Simulator should be designed in such a way that it can upright at his/her own to perform realistic examination as in case of a real patient.
5. Simulator internal structure should be designed in such a way that all electronics part is separated completely from various fluid reservoirs so that to make more durable and easy for troubleshooting.
6. It should have facility to fill and drain all fluids externally without need of opening any part to refill fluids to make it ready for next training.
7. Simulator must be supplied with:
Manikin
Conversion Kit from Female to Male

7. Intramuscular Injection Trainer

- Model should be good for multi skill training such as venepuncture, percutaneous injections, wound care, urinary catheterization and nasogastric (NG) insertion
- Should be made of lifelike material
- The portable multifunctional device should be ideal for use in a variety of settings including athome deliberate practice to enhance skill mastery.

Should have clinical skills:

- Venepuncture land marking and insertion
- Percutaneous injections
    - subcutaneous injection
    - intramuscular injection
- Sutures removal
- Staple removal

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- Genial hygiene
- Urinary catheter insertion
- Nasogastric tube (TNG) insertion
- Wound care (Linear wound)
- Deep wound care with tunnelling
- Tracheotomy care

8. Urinary Catheterization Training Manikin

- Should be a model that realistically demonstrate, practice and evaluate female and male bladder catheterizations either via the urethra (transurethral) or the abdominal wall (suprapubic).
- The easytochange genital inserts are placed into the anatomically correct lower abdominal model and held in place with magnets.
- Female and male catheterization with realistic resistance
- 3 levels of adjustable narrowing of urethra
- Soft and movable foreskin and labia (for practicing disinfection, for example)
- Anatomically realistic pelvic structure
- Liquid outflow if catheterization is successfully carried out
- The transparent bladder can be checked, and the abdominal wall can be removed
- Training of suprapubic catheter changes as well as their cleaning and care
- Stands securely on the table thanks to the nonslip feet
- Magnetic connectors for quick setup and dismantling
- Easy to clean and maintain, and can be completely taken apart
- A sponge on the inside prevents a buildup of moisture

9. BP Arm Trainer

- Simulator should allow the presetting of values for both systolic and diastolic pressures.
- Able to provide an excellent means to practice listening to and distinguishing blood pressure sounds prior to actual clinical experience.
- It is possible to audibly discern the five Korotkoff phases.
- Should have durable control unit
- Must have palpable radial pulse
- Simple calibration procedure
- Control Unit Allows Instructor to:

- Adjust pulse rate
- Select systolic and diastolic settings
- Adjust volume
- Turn auscultatory gap on or off
- Easily calibrate unit for use with any sphygmomanometer

- Students:
- Auscultate Korotkoff sounds with any stethoscope through a speaker in the arm
- Can check palpable pulse at the radial site
- Pressures are activated at release valve
- Pump cuff
- Read pressures on sphygmomanometer
- Use normal procedure to place cuff on arm

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10. Episiotomy Trainer

- Model should be a replica of external female genitalia
- It should be malleable, with that lifelike skin feeling of realism
- Should be entirely made of realistic skin for extremely realistic training experience
- Model should allow students to practice episiotomy suturing and hemorrhoid identification
- Can do perinial repairs with surgical instruments
- Model should be made of realistic skin that is nonmoulding and hypoallergenic
- Should be easy to clean and long lasting

11. Interval, Postabortion and postpartum intrauterine device (IUD) insertion trainer

- Should be a fullsize adult female lower torso with relevant internal anatomic landmarks
- Can do bimanual pelvic examination
- Should have palpation of normal and pregnant uteri
- Can do a vaginal examination (including insertion of speculum)
- Should offer visual recognition of normal and abnormal cervices
- Have uterine sounding
- IUD insertion and removal
- Contraceptive sponge insertion and removal
- Female condom insertion and removal
- Diaphragm and cervical cap insertion and removal

12. Normal Delivery and Pelvic Trainer

- Model should be good for the skill training in normal deliveries, in complicated deliveries and in obstetric emergencies
- Should enhance the training of delivery skills, following of protocols and reaction in emergency.
- Model should be helpful to simulate **a** ssessment and manipulation of fetal positions

Should have delivery training skills and techniques features:

- Normal vaginal delivery
- Normal delivery of umbilical cord and placenta
- Palpation and assessment of fetal position and presentation
- Diagnosis of all normal and abnormal fetal positions and presentations (like face, neck, or brow) to represent routine and difficult deliveries
- Shoulder dystocia demonstration and management
- Breech deliveries (including complete, footling or incomplete, and frank breech presentation)
- Palpation of fetalfontanelles features
- Complete and incomplete placenta birth

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- Demonstration of placenta previa: total, partial, and marginal
- Prolapse of umbilical cord
- Nuchal umbilical cord
- Cesarean delivery through precut incision
- Clamping and cutting of umbilical cord
- Simulated suctioning of baby's mouth and nose
- Pinard'smaneuver
- MauriceuSmellieVeitmaneuver
- Prague maneuver
- Woods maneuver
- Rubin

Should have obstetric teaching and training features:

- Fully articulating fetus with open mouth, tiltable head, shoulder blade, and anatomical correct fontanelles
- Lifesize adult female lower torso, anatomically correct landmarks like pelvis, pelvic cavity, and spine
- Manual birthing system to control rotation and speed of fetus delivery
- Easy to change position of fetus during birthing process including descend, flexion, extension, internal and external rotation, and restitution
- Easy changeout of parts through pin connections, no tools necessary
- Antislip base and handles for extra support on tables

13. Centre management with Audio-Visual Recording, Briefing and Debriefing System

A. **System Software with following specification** : Should have all in one web -based software application that includes all center management features on one platform without requiring user licenses, site licenses or add-on software modules.

Software features should include:

a. Recording
b. Review
c. Reports
d. Case Manager
e. Activities
f. Calendar
g. Schedules
h. Resource Manager
i. User Manager
j. System Manager
k. Lightweight directory access protocol LDAP Integration

Review

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a. Immediate access to recorded data in order to review complex recordings of all camera, simulator, and peripheral device feeds assigned to the room
b. Access and control all recorded videos on one page (debriefing, deleting, downloading, renamingor reassigning videos)

Assess

a. Intuitive interface for creating custom checklists / rubrics for Learners, Faculty or SPs
b. Faculty / Staff can complete user-customized assessment rubrics, while watching live or recorded video
c. Learners can interact with a variety of the data entry (i.e. SOAP Note, Step II CS write-up, handoff note, etc.)
d. Case evaluation, as well as, self and peer evaluations
e. Control Learner data entry with timer Faculty / Staff can grade any write up or short answer question, submitted by Learners
f. Standardized Patients can complete checklists, assessing the Learners, as well as each other
Search, preview, and have the ability to reuse all questions

Report

a. Generate and export custom reports, covering both the group and individual performance, or use one of the many predefined report options
b. Give Learners access to their reports at home or on campus
c. Export data from system to work with outside of system (excellent system for researchers)
d. Review Faculty and Standardized Patient performance reports for quality assurance and consistency
e. Follow Learner progress in key skill areas, throughout their career, within your program

Integrate

a. Connect with any patient simulator to capture 360ºlive simulation data Connect any simulated or real patient monitor for capturing and broadcasting HD screen image
b. Optical character recognition, to turn the video signal from monitor into real-time data streams, for visual trend charts and searchable physiological data
c. Use predefined layouts or define your own, for identifying key captured values on the connected screen
d. Remote site configurations

Server should have following Technical specification

Should have One server appliance offers a 1:1 ratio between recording areas, simulator and recording appliances with the following built-in components:

a. System should be supplied with 32” HD LED Display

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B. Portable center management solutions which can be moved easily from one simulation room to another or field training including audio-visual solution for debriefing

Web-based audiovisual solution for simulation and clinical skills debriefing system should automatically records video and data when activity is in play.

Server technical Specifications:

The scope of supply is as follows:

- Laptop with minimum 13" screen.
- 2 nos Wi-Fi HD cameras with flexible tripods
- 2 x rechargeable camera batteries for 6 hours of continuous operation
    - HD Display Capture unit with frame grabber, Dual mode VGA and DVI/HDMI capture, and Input resolutions up to 1920x1200

14.Abdominal palpation mannequin with leopold manoeuvre

- One piece fetal baby with palpable fontanelles, spine, shoulders, elbows, and knees
- Fetal baby may be placed in normal, breech, or transverse position
- Fetal baby cradled between two "cushions"
- Cushions may be inflated independently of the other; inflation of the lower cushion raises the fetus to desired position; inflation of the upper cushion creates a firm abdomen as in the ninth month of pregnancy

Features:-
• Fetal baby
• Upper and lower cushions that cradle baby
• Inflation devices.

15. Human foetus replicas
Life/form Fetus Replicas add dramatic realism to the study of prenatal human development. Each replica is an actual reproduction, and offers an accurate and exciting way to study external development and growth of the fetus.

16. Cervical dilatation board
Cervical Cups (with all dilation like 4, 6 & 8 cm dilations) for assessment of dilatation of cervix.

17. Cervical dilatation block
Complete per-vaginal examination and fetal head assessment.

18. Pelvis

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This skeleton is great for detailed study of the skeletal anatomy of the female pelvis, consisting of hip bone, sacrum with coccyx and 2 lumbar vertebrae as well as movable symphysis for demonstrating maternal pelvis bones, landmarks and diameters.

19. Mannequin for simulation and management of PPH (Mama Natalie)

- Delivery of Incomplete placenta
- Administration of oxytocin injection
- Controlled cord traction
- Urine bladder catheterization
- Handling of a stretched perineum
- Reducing the risk of damaging the baby or mother

20. Zoe model with postpartum uterus

- A simplified human anatomical model of a Postpartum Uterus after birth to support training in postpartum intrauterine device insertion, uterine balloon tamponade insertions and other postpartum uterus interventions.
- A simplified human anatomical model with both an interval uterus and a post-abortion uterus to support training for a variety of sexual and reproductive health interventions such as vaginal examinations, IUD insertion and removal, and for inspecting anteverted and retroverted position of the uterus.

21. **Anteverted and retroverted uterus**

- Demonstrating normality and abnormality of position of uterus.

22. Hand held uterus model

- Coronal section of uterus, ovaries & fimbriae
- Clear plastic window permits easy viewing of IUD
- Permit easy demo of inserting & removing of IUD

23.Neo Natalie and Preemie Natalaie

Realistic new-born Simulator for demonstrating-

- New-born examination,
- Reflexes
- Newborn care
- Phototherapy
- Resuscitation
- Breast feeding
- Immunization
- Exchange transfusion
- Identification of abnormality
- Lavage/gavage, suctioning.
- Essential newborn care
- Kangaroo Mother Care
- Premature care.

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*** Computer Lab Area – 1500 Sq. Feet**
*** Desktop Computer No. – 10**

*** All models should he quoted together as a Turnkey Setup.**

* Each modal (Low or High Fidelity) should have a module for training including objectives, methods and assessment. Module can also have hybrid models where real patients or standardized/simulated patients/computer simulations can be used.

* There shall also be space for CAL lab with adequate computers.

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